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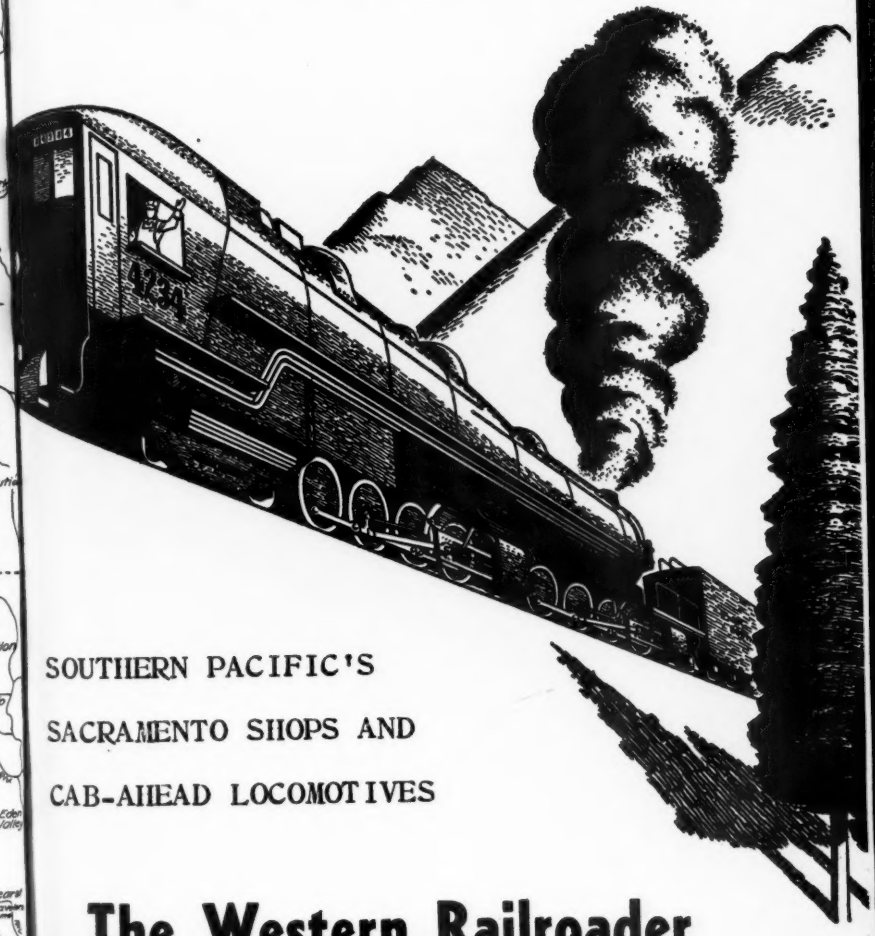

SOUTHERN PACIFIC'S
SACRAMENTO SHOPS AND
CAB-AHEAD LOCOMOTIVES

The Western Railroader

For the Western Railfan

Vol. 15—No. 9 Issue 153

Over the Editor's Trainsheet

The History of the Sacramento Shops for this souvenir issue is reprinted from a Railway & Locomotive Historical Society Bulletin, "The Romance of the Railroads Entering Sacramento" by D. L. Joslyn. Dave Joslyn, as he is known to his many friends, is the dean of Railroad Historians on the Pacific Coast and has himself worked in the Sacramento Shops for many years. There can be no doubt of his knowledge of the subject and as Historian of the Pacific Coast Chapter he has acquited himself well in the preservation of this historic story. As he summerizes it:

"Today, freight cars, locomotives and all sorts of parts for the different departments of the railroad are still being made at the shops, and the last order for locomotives that were built by the eastern builders, included a number of the parts made at the Sacramento shops and shipped to the builders to apply to the locomotives being built.

"The spirit of Mr. Stevens, of Mr. Stoddard, of "Uncle" Ben. Welch, of Stephen Uren, of Mr. Baxter, and a host of others that have left their mark on the shops, seems to hover over the place to urge the younger generation to carry on the work that they started in the 60's, when it was not possible to rush out and buy what was needed, but had to be made at the "Works" and before they could be made, had to be thought out. Sacramento Shops has a glorious past and there is no question that its life will be long and useful. It is not possible to down the spirit of the harder pioneer. That spirit that built the west and wrested from Mother Nature her treasures at such terrible hardship, still lives, but those of us whose hair has grown grey, and whose step is less sprightly, can begin to see a change in the spirit of the entire west. Let us hope that it will not die out entirely and like many of the branches of the railroad be entirely abandoned."

The Romance of the Railroads Entering Sacramento was issued in 1939 as Bulletin 48 of the Railway & Locomotive Historical Society. At last reports copies were still available at $2.00 by addressing the Society care of Baker Library, Harvard Business School, Boston, Massachusetts.

NORTHERN CALIFORNIA RAILROAD CLUB

The Western Railroader

For the Western Railfan

P. O. BOX 668, SAN MATEO, CALIF.

FRANCIS GUIDO, *Editor*
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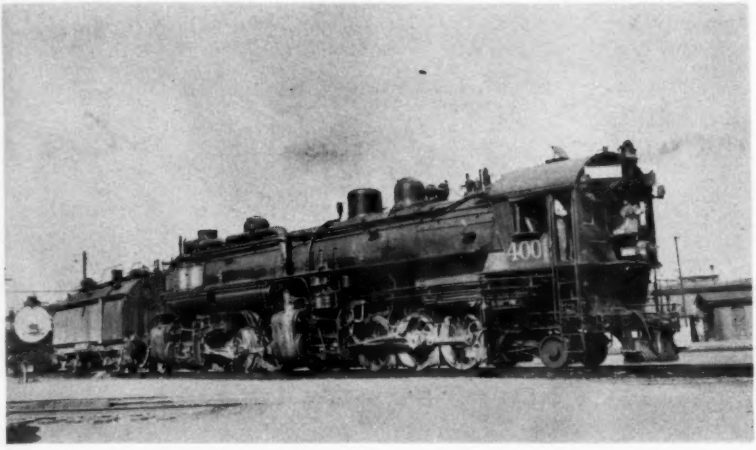


#4002 - Class AC-1 built in 1909. This engine was the first cab-in-front engine on the Southern Pacific. This picture was taken after the engine was converted from compound to simple.

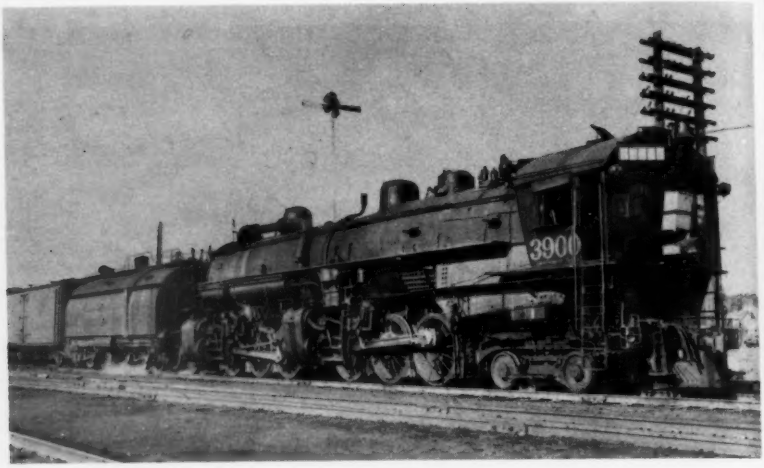
SOUTHERN PACIFIC'S CAB-IN-FRONT LOCOMOTIVES

By David L. Joslyn and Fred A. Stindt

The story of the Southern Pacific's cab-in-front locomotives starts with two conventional articulated compound mallets built by Baldwin and received at Sacramento in April, 1909. These engines, numbers 4000 and 4001; operated in the conventional manner with the smoke box ahead.

They were set up and placed in service on the Sacramento Division over the Sierra Nevada mountains where they outperformed existing power by a wide margin. The locomotives were not in service long, however, until the engine men began to complain about the hot gas and steam that enveloped the cab and made it most uncomfortable for them. There are a number of tunnels on the Sacramento division and in those early days of the first mallets, nearly 40 miles of snow sheds. The exhaust would hit the ceilings of the snow sheds and tunnels and come down in a cloud around the cab.

Mr. Charles Browning, Jr., Engineer of Tests at Sacramento Shops, ran the usual tests on the locomotives on water and oil consumption and in addition studied the hot gas nuisance. On one of the test trips there were present in addition to Mr. Browning, Mr. Bertram Kline, Assistand Engineer of Tests; Leland Stanford Pratt, Master Mechanic of the Sacramento division; Mr. H. H. Forney, Chief Air Brake Inspe-



#3900 - Class AM-2 built in 1911. This class was originally numbered 4200-4211, but were renumbered to make way for more AC's. They are now all scrapped.

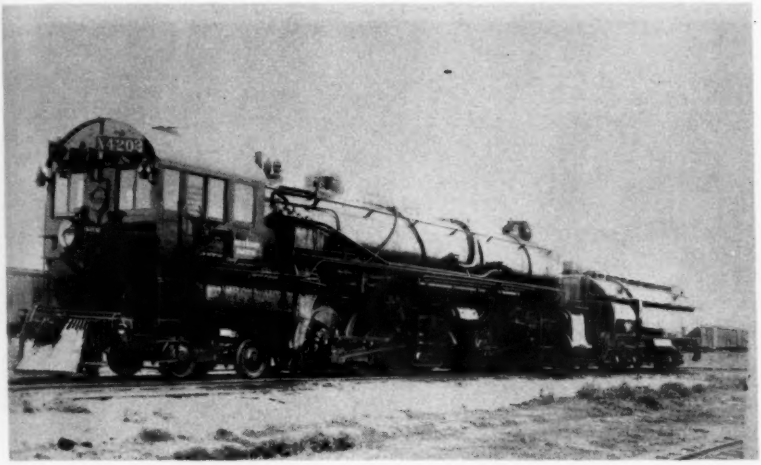
tor of the Northern District; "Doc" Baird, Road Foreman of Engines, Northern District; Mr. Frank Russell, Sr., Chief Draftsman, Locomotive Department; and several others.

On the return to Sacramento, these men met in the office of Taylor W. Heintzleman, Superintendant of Motive Power for the Northern district, and discussed what could be done about the problem. As the story goes, Mr. Browning turned to Frank Russell and said "Frank, you are a smart man, and I think you remember there was a narrow gauge engine down around the bay that operated cab end ahead. Seems to me you could work out something like that." Mr. Heintzleman approved the idea and the idea took root.

Mr. Russell on his return to the general office took the matter up with Howard Stillman, Chief Mechanical Engineer, and permission was given to go ahead with plans. The plans were submitted to H. J. Small, General Superintendant of Motive Power and by him to the management.

The new design was sent to Baldwin which was getting ready at the time to build 15 more articulated compound locomotives for the Southern Pacific. These locomotives were built and delivered as cab-in-front engines arriving at Sacramento in February and March of 1910. They were locomotives 4002 to 4016 and thus #4002 can be said to be the first cab-in-front locomotive on the Southern Pacific.

The 4000 and 4001 were placed in service on the run to Dunsmuir where there are few tunnels and their conventional construction was no difficulty. They were rebuilt to operate cab end ahead in 1923 and rebuilt to simple in 1931.



#4202 Class MM-1 built in 1911. This picture shows engine as a compound. The series later were converted to simple and renumbered in the 3900 series. All are now scrapped.

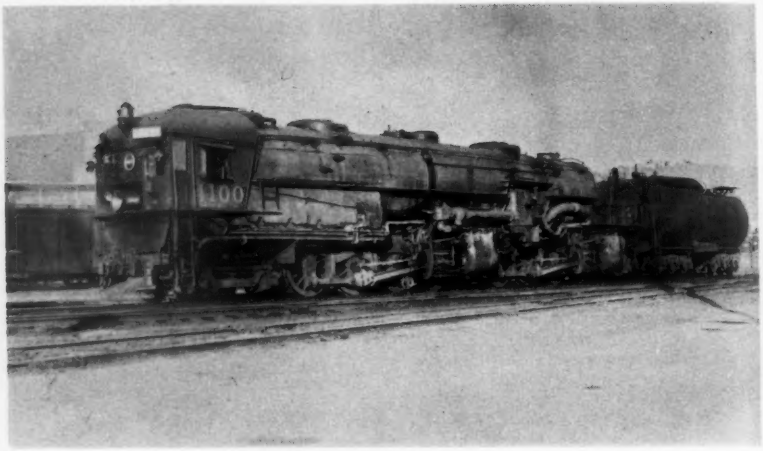
The original cab ahead engines had 9000 gallon rectangular tenders with oil tanks high up on the tenders and it was thought that the oil would flow to the burner from the tender along under the boiler to the firebox, but on the steep slopes of the Sierra Nevada mountains, this did not work out. Operation developed that the oil would not flow to the burner except for the first foot of oil when the tank was full.

Sacramento shops built new and larger oil tanks and braced them with stay rods. The filling dome was made air tight with a leather gasket and air pressure was applied. It was found that five pounds air pressure would force the oil to the burner. A safety valve was applied to the top of the oil tank, set to blow off at ten pounds, so that the pressure would not build up.

Another source of trouble was the fact that steam entered the high pressure cylinders under the back portion of the locomotive and there would be 5 or 6 revolutions of the wheels on the back engine before steam would begin to exert power on the forward engine. The result was the two engines pulling against each other and the center pin worn out in a position where it was hard to renew.

A starting valve was added to admit live steam to the low pressure cylinders until the engine got to working compound. This starting valve was operated manually by the engineer and if too much steam was admitted the front engine would slip badly.

The MC's proved so satisfactory that 31 more 4017-4048 were delivered in 1911-12-13.

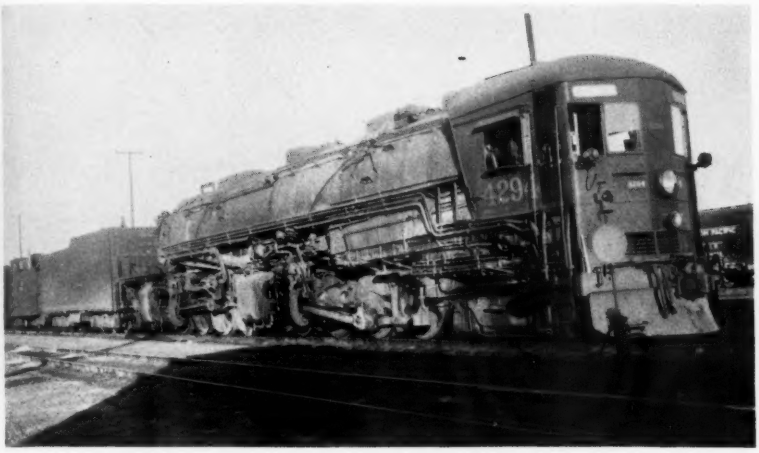


#4100 - AC-4 built in 1928. Oldest and lowest numbered cab-in front mallet in service today on the Southern Pacific.

In 1911 the S.P. received from Baldwin 12 articulated compound mallets of the 2-6-6-2 arrangement numbered 4200-4211 (later 3900-3911). These engines had semi-cylindrical tenders on the back of which was a vestibule as the engines we re to work passenger trains over the mountains. They had 63" drivers as contrasted to the 57" drivers of the AC's. These engines had a 45" pair of wheels under the cab that would leave the rails on the sharp curves. A 4-wheel truck was applied under the cab and that ended that trouble.

About 1925 competition began to develope from trucks on the hgihway and the old 2-8-8-2 Mallets being slow in getting freight over the hill. Consideration was given to rebuilding them to make more speed. First the boiler pressure was increased and that helped some. Then, a new pair of cylinders were cast to take the place of the low pressure cylinders and the high pressure cylinders were bushed down, making all four cylinders the same diameter. Thus the locomotives became plain articulated engines.

The original design had the boilers in two sections with a 54" space between though there was no flexible portion between the front and back such as was the case with some of the Santa Fe articulated locomotives. The back portion was a regular boiler whild the front portion was a pre-heater into which the feedwater was fed through injectors, thence from the top of the pre-heater into the regular boiler. In 1927 the drawing room redesigned the boilers making them one piece and doing away with the preheater and the 54" space that was wasted. The boilers we re superheated, cylinders were made 22" diameter by 30" stroke and feedwater heaters were applied.



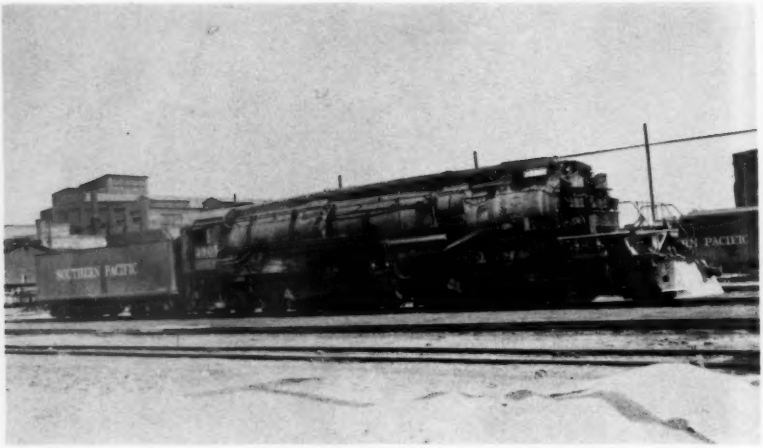
4294 Class AC-12 built in 1944. Highest numbered mallet and last steam engine purchased by the Southern Pacific.

The first of the old MC class locomotives to be completely rebuilt was the 4028 in 1928 and it proved so satisfactory that the remainder of the old Mallets were ordered rebuilt. A Bethlehem two-cylinder, 4-wheel booster was applied under the rear tenders of engines 4010 and 2028; but they did not prove satisfactory and were later removed. All of the MC locomotives were rebuilt to simple except the 4011, 4013 and 4022 which were dismantled in November and December of 1936.

The MM class locomotives (4200-4211) were also rebuilt to simple and changed to class AM. The MM--Mogul Mallet became the Articulated Mogul--AM. The MC--Mallet Consolidation became the Articulated Consolidation--AC.

The first of the newer articulated consolidations were received from Baldwin in October, 1928with 26 engines (4100-4125)in the order. Twenty five more (4126-4150) were delivered in 1930. In late 1936 and early 1937 the SP received twenty-six more (4151-4176) In 1937 the 4200-4211 were renumbered 3900-3911 to clear the way for more AC's. twenty-eight more AC's were received in 1939 (4177-4204). After Pearl Harbor the SP ordered ninety more of the giant cab-in-front engines. The 4205-4294 were received during 1942-43-44. The 4294 was placed in service in March, 1944--the last new

In 1939 the SP also bought 12 coal burning articulated consolidation locomotives from Lima with the cab in the conventional position (3800-3811). During the war the SP purchased two conventional mallets of the 2-6-6-2 type from Verdi Smelter Company numbered 3930 and 3931. They have scrapped the 3931.

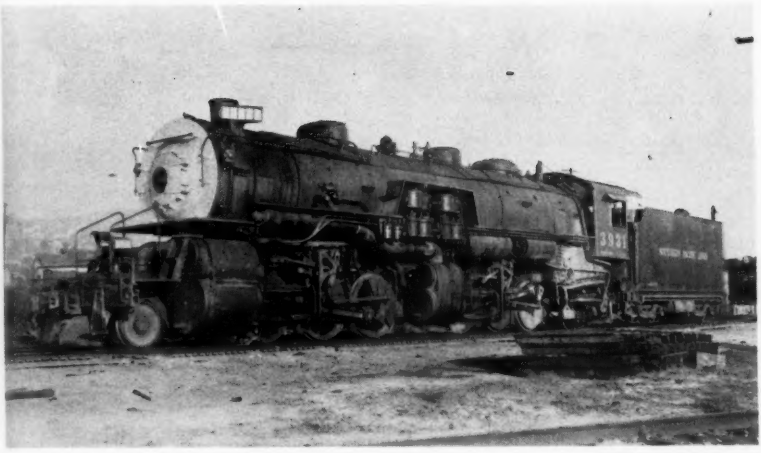


#3805 Class-AC-9 built in 1939. This class was originally coal burners, but have since been converted to oil. They are used on the El Paso-Tucumcari District. Stindt photo

OUR ENGINE TODAY - - 4100

The engine pulling the train today is number 4100 which was built by Baldwin Locomotive Works and first saw service on the Southern Pacific out of Roseville in October of 1928. It is class AC-4 which is the oldest class of mallets still in use on the Southern Pacific. It tender is class 160-C-2P which means that the tender is 16000 gallons water capacity, is cylinderical in shape, is second in the series of this type tender and the oil tank is under air pressure. The capacity of the fuel tank is 4889 gallons of oil, but is never filled to capacity, but to the marker bar in the tank which is set at 4703 gallons. The extra space is for expansion of the oil when it is heated. The tender is equipped with clasp brakes, which means that there is a brake shoe on each side of the 36" diameter tender wheels.

Today, the mighty mountain mallets have just about been pushed out of the Sierra Nevada's by the unromantic four unit freight diesels, though they are still used as helpers. They are still used on heavy through freights all over the system and Southern Pacific officials indicate that they will be around for many years to come.

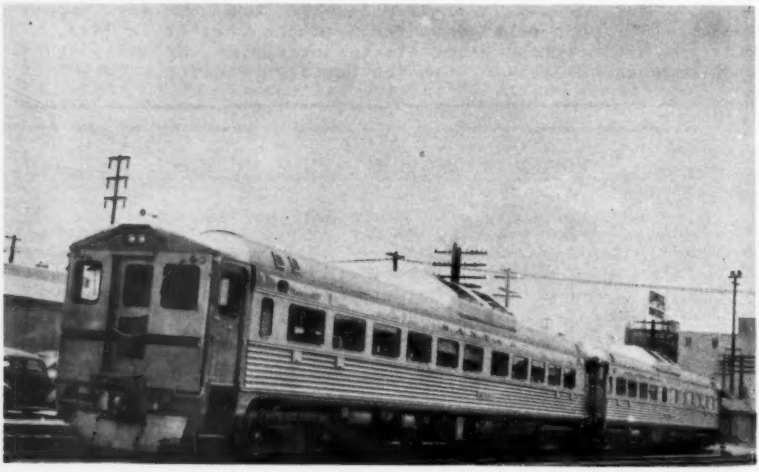


#3931 Class MM-3 built in 1920 for the Verdi Smelter Company as its #500 and purchased by the Southern Pacific in 1943. This engine is scrapped and its sister engine, 3930, is the only compound mallet left on the Southern Pacific.

ROSTER OF SOUTHERN PACIFIC MALLETS

3800-3811	2-8-8-4	AC-9	Lima	1939	In Service
3900-3911	4-6-6-2	AM-2	Baldwin	1911	All Scrapped
3930-3931	2-6-6-2	MM-3	Schen.	1920	3931 scrapped
4000-4016	2-8-8-2	AC-1	Baldwin	1909-10	All Scrapped
4017-4028	2-8-8-2	AC-2	Baldwin	1911	All Scrapped
4029-4048	2-8-8-2	AC-3	Baldwin	1912-13	All Scrapped
4100-4109	4-8-8-2	AC-4	Baldwin	1928	In Service
4110-4125	4-8-8-2	AC-5	Baldwin	1929	In Service
4126-4150	4-8-8-2	AC-6	Baldwin	1930	In Service
4151-4176	4-8-8-2	AC-7	Baldwin	1936-37	In Service
4177-4204	4-8-8-2	AC-8	Baldwin	1939	In Service
4205-4244	4-8-8-2	AC-10	Baldwin	1942	In Service
4245-4274	4-8-8-2	AC-11	Baldwin	1942-43	In Service
4275-4294	4-8-8-2	AC-12	Baldwin	1943-44	In Service

Total mallets in service today--208. Through some error the AC-1-2-3's are listed in Best's roster as 4-8-8-2's. The MM's were changed, but not the CM's.



SANTA FE's RDC Budd diesel coaches now in service between Los Angeles and San Diego. The above views taken on the first day of regular service, May 21, 1952. Top view taken at San Diego and bottom outbound from San Diego as train #81. Photos from R. P. Middlebrook.

HISTORY OF THE SACRAMENTO SHOPS

In order to give an accurate history, or outline of the mammoth shops that are located at Sacramento, it will be necessary to go back to the early sixties, or to the late fifties, to the Sacramento Valley Railroad at Folsom and also at Sacramento.

The first cars built on the coast were built by the Sacramento Valley railroad at third and R street in Sacramento. They were what were termed "platform" cars, or as we know them, flat cars. They were entirely of wood, put together with bolts and nails, and the greater part of the trucks was also wood. The wheels were cast in a small foundry at Front and I street and most of the castings used in the cars were made in this small foundry. The forgings required were made in a shop on Front street near O street, the bolts and nuts having been purchased locally from any source where they could be obtained, some coming from stores in San Francisco.

Several small sheds were finally erected at Third and R street and the forges ordered from New York having arrived, the work of creating the different parts of the iron was carried on at this point until the road was completed. In the meantime, wheels and bar iron, as well as small plates of steel and iron, having arrived from New York and Boston, the work of building 5 first class passenger cars, one baggage car and a combination mail, express and baggage car was started at the shed on Front and R. These were completed by the time the road was open for business. From reports given me by several of the older employees of the C. P., who had previously worked for the S. V. R. R., some of these passenger cars, built in 1855 and 1856, were in use as late as the early nineties, showing the fine workmanship of the early builders.

After the S. V. R. R. was in complete running order, the railroad ran into trouble with the City of Sacramento on account of using part of the streets for their building. The S. V. R. R. having acquired more ground at Folsom than it needed, they proceeded to follow out the suggestions of the Superintendent and erected brick buildings at that point, installing a cupola of six tons capacity for making iron castings; a small brass furnace; a machine shop, well equipped with machines and tools, and a car building shop. In addition, there was a good sized forge shop erected and ten forges installed. Smaller buildings of wood were erected for copper and tin work and the S. V. R. R. was equipped to do any work in connection with their railroad that might require attention.

Mr. Benjamin Welch, who had started his career as a railroad man at the age of sixteen in the Portland Locomotive and Car Shops, in the city of Portland, Maine, having arrived in California in 1852, and who, having failed as a miner, was engaged as Superintendent of the Folsom shops in 1856. Under his able guidance the shops flourished, turning out in addition to railroad cars and repairing railroad equipment; mining machinery, stoves, wagons, scrapers, bolts and nuts, forgings of all kinds and castings for any purpose. Raw material had to be brought by steamer from San Francisco, hauled to Freeport or Sacramento and thence to Folsom by the railroad. But with all that, the Sacramento Valley railroad made different articles of cast and forged and shipped

them back to San Francisco at a profit. At the peak of the prosperity of the Folsom shops, there were 300 men and boys on the pay roll. After the beginning of the Central Pacific R. R. in 1863, the shops at Folsom began to decline and in 1869 the Central Pacific, which had acquired the S. V. R. R., closed the Folsom shops and moved the machinery to Sacramento.

When the Central Pacific R. R. began to receive locomotives and cars on the wharf at Sacramento, they had no buildings of any kind, no machines and few employees. Such machine work as was required was taken across the levee to the machine shops of Goss and Lambard, who had the best equipped machine shop in the city at that time. This shop also boasted a small brass foundry and a small iron foundry.

The first building erected by the C. P. was a small shed on the levee near the foot of I street. This was used for storing tools and also boasted a vise and a small forge. This building was later used as the first ticket office for the C. P. and stood on the levee from 1863 until some time in 1908 it was finally torn down.

In the fall of 1863, the C. P. R. R. started to erect a few wooden buildings on the banks of the old slough on Sixth street near H street. The first building was 20x150 feet, in which 20 or 30 men were employed. Mr. Welch, having left Folsom and gone to the San Francisco and San Jose R. R., Mr. Huntington, who was a personal friend of his, engaged Mr. Welch as Superintendent of the shops of the C. P. His official title was Car Master, but to the duties of getting cars built and keeping those in order, he was also given the position of General Superintendent of Construction. Under his direction an addition of 130x30 feet was added. This comprised the shops, with the addition of a few smaller buildings, until 1867 when plans were drawn and work started on the foundations of the present brick structures. In the meantime, Mr. I. H. Graves was employed by the C. P. as Master Mechanic. The need for a competent mechanic to erect the lathes, drills, stationary engines and boilers was deeply felt. Mr. Graves had known a young man in Brattleboro, Vermont, named George Stoddard and learning that Mr. Stoddard was in California, he hunted him up and engaged him as Shop Superintendent to erect machinery and get the shop going, as it was badly needed. Goss and Lambards' place was too small for the work in hand.

Mr. Stoddard arrived in Sacramento in 1865 and went right to work getting the machinery off the wharf, putting it in place and running. Mr. Stoddard had been mechanical draftsman for the Connecticut River Railroad at Northampton, Massachusetts, and in addition to his duties as Shop Superintendent, he also did what drafting as was required.

In 1867, as before stated, the foundations were started for the new shops. These foundations were laid in the old slough north of town, which slough had been deeded to the railroad company for their shops. Piles were driven in four feet of water, the piles being driven until the tops were even with the water line. Rip-rap in the shape of granite from Rocklin, 20 miles east of Sacramento, was hauled in and dumped around the piles. Sand and silt was hauled by wagons from the nearby American and Sacramento rivers and the slough filled in, or as much as

was needed. Four feet of solid granite was laid on top the piles and rip-rap and brick laying was started in earnest. The first building finished was the car shop, 90x230 feet, to which an L, 90x40 feet was soon added. Shortly after this, in 1868, the foundations were laid for an addition to the car shop, 100x200 feet. The foundations were also laid during this time for the machine shop, 100x205 feet, a round house of 28 stalls, a blacksmith shop 60x125 feet, a boiler and engine room 50x78 feet and a paint shop for the car department of 70x225 feet. These buildings were all made of brick, placed on piling driven in the waters of the old slough. They were all completed and occupied during 1869, at which time the machinery, except the foundry was moved from Folsom to Sacramento. During the time the buildings were being erected, Mr. Stoddard was working on the drawings for an engine to work the various machines in the mill and machine shop. This engine was built at the shops, some of the castings were made at Folsom, some at the works of Goss and Lambard and most of the machine work was done at Goss and Lambards. A pile foundation was laid for the engine, boilers and stack to rest on, and that stack is still there in 1939, as solid as the day it was built. It contains 600,000 bricks, in the chimney itself, with 60,000 bricks in the foundation base. It is 92 feet high above the present elevation of the shops. It has a batter of ⅜" giving it a six foot taper. Surmounting the stack is an iron cap weighing 1 ton.

The Corliss engine had a cylinder 20 inches diameter, four and one half foot stroke, 18 foot fly wheel weighing 14 tons and the engine developed 80 horse power. This engine was in constant use from 1869 when it was placed in operation, until some time during 1910 when the machinery was all equipped with electric motors. The engine was finally scrapped and torn out about 1917.

In the meantime, over one hundred teams were busily engaged in hauling sand and silt from the river to fill in the shop grounds, raising them four feet above the water line of the old slough. By late 1869, 20 acres had been filled in, leveled off and in use by the company.

The machine shops of Goss and Lambard were purchased by the railroad and some of the machines were moved to the shops, some were left where they were and used by the C. P. This included the foundry, which was used until late in 1871 when the foundry in the shops was erected near Sixth and H street. The old foundry on I street was used for a number of years after the shop foundry was erected, but was finally abandoned. The old building is still standing, and was for a number of years used as part of the city jail, remaining the property of the railroad and leased to the city. The railroad now uses the building as a storage for old records.

By the middle of 1872, the wheel foundry was completed and placed in operation, and this foundry furnished all the wheels that were used in new construction. By the early part of 1878 the wheel foundry was turning out wheels at the rate of 112 wheels per day. In 1881 the new iron foundry was started and when completed the shops were able to cast anything that was required in the way of grey iron.

In the meantime, there was erected of wood and corrugated iron, a boiler shop 60x200 feet with a tower for the steam rivet bulldozer, and a small building close to the boiler shop, for the care and repair of tenders. In 1870, Mr. Andrew Jackson Stevens was brought up from the San Francisco and Alameda R. R. and placed in charge of the mechanical department as Master Mechanic under Mr. Perkins. In 1871, Mr. Perkins leaving the company, Mr. Stevens was placed in complete charge of all the mechanical departments. Mr. Stoddard was then placed in full charge of the drafting of all parts for locomotives and cars.

Mr. Stevens was a thorough mechanic and had a far seeing eye. He could see that many of the locomotives that had been hastily built by the eastern builders lacked many features that impaired their capacity for the work over the Sierra Nevada Mountains. He set about altering the older locomotives, and in conjunction with Mr. Stoddard, worked out plans for new, larger locomotives and saw no reason why these could not be built in the shops just as reasonably, if not more so than those bought from the builders. Plans were prepared by Mr. Stoddard and work was started on ten new eight wheel locomotives, the first one turned out in July 1872 and was given the number 173 which had previously been assigned to an 8 wheel Norris-Lancaster engine. This Norris-Lancaster engine was broken up in 1872.

Mr. Stoddard was called into the office of Mr. Stevens one day and asked, "Can you design a rolling mill?" Without stopping to think, Mr. Stoddard said "Yes!" He had never seen a rolling mill, but started right to work on the job and in due time the small experimental mill was set to work, and it was kept at work until sometime during 1930 when the rolling mill at Sacramento was shut down for good.

From the amount of iron rolled and the savings made, both as to money and time, the mill was a success and a larger one was designed and built during 1879, Mr. Stoddard designing the complete machine from the huge upright engine to the smallest part of the rolls and furnaces. This was so successful that another mill of the same size and capacity was constructed during the early 80's and another small mill was built about this time.

During the early days of the shops, that is during 1865, Mr. Welch was called upon to construct some sort of a snow plow to assist in keeping the road open, as the snow was a real hindrance to the builders. Mr. Welch and Mr. Stoddard had never had much to do with snow plows, but nothing daunted they started in and constructed the giant Bucker Snow plow that did such valiant work in keeping the deep snows of the Sierras from holding up the onward rush of materials to end of track. In conjunction with Mr. Stoddard, Mr. Welch designed and built at the shops, and later secured a patent on a "Framer and Tenon Machine" thereby making a large saving in building the cars that were badly needed. The "Emigrant Sleeper" was also a product of the Sacramento shops, and later there was produced the Tourist sleeper under the direction of Mr. Welch.

Later, some of these Tourist sleepers were constructed by the Pullman Company and were exhibited at the Railroad Exposition in Chicago in 1884 and received much favorable comment from the railroad world in general.

Business continued to be good on the Central Pacific and more powerful locomotives were required to handle the increasing tonnage over the Sierra Nevada Mountains. Accordingly, the new engines were designed at the shops and the first one was built there, the now famous 229 being the first one constructed. When that engine was finally built and tried out, it was such a success that Cook was given an order for 20 more just like it, except that the cylinders on the Cook engines were 20x30, whereas the 229 had 19x30 cylinders.

Mr. Stevens and Mr. Stoddard then directed their attention to a still larger engine and the C. P. 237, the "El Gobernador" was built. This locomotive attracted a great deal of attention of railroads from all the country and was a radical departure from the conventional locomotives of the period. The engine was equipped with rotary valves and was actuated by a modified gear, similar to the Stephenson link but with some alteration. The rotary valves not proving satisfactory, they were removed and a double valve applied with a new design of valve gear worked out by Mr. Stoddard under Mr. Stevens direction. The 237 was the only engine that was equipped with this type of gear.

When built, the C. P. 237 had cylinders 21x36 and drive wheels 51" dia. The wheel arrangement was 4-10-0. The wheels were increased to 57" dia. when the rotary valves were removed. As finally turned out and placed in service in 1884, the 237 weighed 18,000 lbs. on the truck and 128,000 on drivers, or a total weight of 146,000 lbs. The boiler barrel was 56" dia., the fire box was 51" wide and 126" long at its largest part, and was 34" wide by 126" long between the wheels.

The steam pressure was 140 lbs and the combined heating surface of the flues and fire box was 1,839 square feet. When first built, this engine was too heavy for the light bridges of the period and it was kept at Sacramento from 1883 until 1884 while the bridges and trestles were strengthened by the M. W. department.

Later, other engines were designed and built at the shops, but the shopmen still talk about the "EL GOBERNADOR." But our little history concerns the shops mostly, hence we will resume where we strayed.

Another genius of the Sacramento shops was Stephen Uren, head of the forge department. Mr. Uren came to the Central Pacific in 1869 as a blacksmith and worked his way up to foreman by 1875. He had very decided ideas regarding heavy forgings and under his direction there was designed and built several steam hammers and large shears and punches. These were designed by Mr. Stoddard and gave valuable service in making the heavy frames and forgings for the locomotives, bridges, steamboats and cars that were turned out of the shops. One of Mr. Uren's earliest ideas was a machine that turned out the car links, (used to couple the cars together) previous to this the links were hand forged. This machine was constantly at work day and night turning out the links made from iron rolled in the nearby rolling mill.

In 1885 Mr. Uren secured a patent on a process for making bolts and nuts from scrap iron. He also devised a machine that turned out the large nuts used in bridge work. Another patent of his was the wrought iron brake shoe, thousands of which were made in the Sacramento shops. He also worked out a machine for making track spikes

from square iron rolled in the mill. This machine would turn out spikes as fast as man could feed the iron to the machine. It headed, sharpened and cut the spike from the rod, all in one blow. Another patent of his was a machine that headed a bolt and cut the slot at the same time. These are all more or less common to the most of us in these days of mass production, but were quite novel in the days when hand work was the usual thing. The machines that made these parts were all designed and built at the shops, and right here I might mention that some of those big shears and punches are still doing active service, day in and day out at the shops, altho they are well over 60 years of age.

Early in 1878, Mr. Stoddard designed a pump for the Sacramento Water works and this was built at the shops. It was a double acting piston pump, steam cylinder 36″ dia. and water cylinders 24″ dia. The air chamber was 36″ dia. by 29 feet high. The cost was $30,000.00 complete installed. This pump was in active service day in and day out from 1878 until 1918, and was removed and broken up during 1926.

Many and varied were the machines, locomotives, cars and pumps that have been built at the shops in the years that they have been established. Street cars were built there, cable cars for San Francisco's steep hills. Palatial private cars, dining cars, observation cars, day coaches, all the cars that were once used on the Oakland locals when that was a steam line, ferry boats, including the boilers and machinery, river steamers, deep well pumps, turn tables, bridges, both wood and steel, bolts, nuts, spikes, switches and switch stands, lamps and lanterns of every description, tinware, cooking utensils, stoves and ranges, wood and iron working machinery, steam hammers, water treating plants, castings of brass, iron, monel, copper, alumnium, steel and bronze. Every kind of forgings—well, it would be impossible to describe just what has been and is still being made at the shops. No job is too small—none too large for the shop force to tackle and carry thru to completion.

In 1878 the machine shop was enlarged and again in 1884 and finally in 1905 the whole machine shop was enlarged to twice its size and a traveling crane installed. The boiler shop was enlarged at this time and several new buildings were erected. Finally in 1910 the last of the old slough was filled in by a suction dredger and new buildings were erected for the frog and switch shop, the spring shop and the brass foundry, and a new building erected for a steel foundry. The steel foundry was placed in operation and turned out a superior product to what could be purchased besides having the castings made when they were needed. During the depression of 1932 and 1933, the steel foundry was abandoned and the furnace sold, and many times since, the S. P. has severely felt the loss of that foundry.

The rolling mill was finally abandoned and the machines scrapped and the loss of that mill is still felt. New methods of making forgings by bulldozer and steam hammers of high capacity as well as a huge press, numerous forging machines and by dies, as well as by the electric welding process, has decreased the number of blacksmiths required to carry on the work. Many of the large parts that were once made from steel castings, are now being fabricated from steel parts by the welding process and are superior, even tho a little costlier than steel castings.

REPORT FROM THE SIERRA LUMBER RAILROADS

The Diamond & Caldor Railway at Diamond Springs has four of its five engines in daily use. Their #4 is a 2T Shay; #6, 7, 8 and 10 are 3T Shays.

The Camino, Placerville & Lake Tahoe is using its #1 on the trains as #2 is in the shops getting another cab following the derailment in the snow.

The Fruit Grower's Supply at Westwood has no railroad logging in operation. Engines 2, 32, 101, 102 and 104 are at Westwood with the other two engines at Camp 10. The only rail operation is switching in the Westwood yards.--Stan Borden

BUCKSPORT & ELK RIVER SHUTS DOWN

The B&ER will discontinue rail service at the end of June and logs will be trucked to Pacific Lumber Company's railhead at Yauger Creek. The B&ER and the timber lands were purchased by Pacific in 1950 from Dolbeer & Carson. Engines 3, 2-6-2 and 5, 2T Heisler will probably go to Scotia or be scrapped. The Elk River Mill engines, #2, 0-4-4T, and 3, 2T Heisler, are still at Falk but the rail connection with the B&ER has been removed.

-- Borden

REDWOOD NOTES:

The Arcata & Mad River Railroad #12 is used between Korbel and Korblex while the Northern Redwood #5, 3T shay, is used from Korbel into the woods. A&MR #7, 2T Shay, is used to relieve either one when necessary. The remaining engine, NRL 25, 2T Heisler, is out of service permanently.

-- Borden

SP SWITCHES ENGINES

SP has removed engine 2454 from the DelMonte pool and plans to scrap it in the near future. Its place has been taken by 2477 which has been given the tender and air horn from 2454. Other engines in the pool are 2453 and 2458. The 2477 will continue to protect 2476 on the Los Gatos run. Engine 1118 recently retired at Los Angeles was the last of the 1100 switchers in service. It will becomea replacement for MW 620 at El Paso.

EXCURSIONS

SUNDAY, JULY 6TH Sacramento Northern excursion to Pittsburg by Bay Area Electric using their car 1005. Lv. 40th & Shafter, Oakland at 9:30 a.m.. Fare $6.00. Write Vic DuBrutz, 314 15th Street, Oakland 12, California.

SUNDAY, JULY 20TH Joint Railfan Picnic Train to Big Trees in connection with SP Suntan Special. Train will run to Big Trees for lunch with short trip to Olympia Pits for pictures. Fare $3.25 from S.F. with lower fares from Peninsula and San Jose. Tickets from Southern Pacific agencies or Tom Norman, 65 Market St., San Francisco.

SUNDAY, JULY 20TH Out of LOS ANGELES the Pacific Railroad Society trip to Ojai and Santa Barbara. Fare $7.00. Write to Pacific RR Society, P.O. Box 5279, Metropolitan Station, Los Angeles 55, California.

SUNDAY, SEPTEMBER 28 The "Sonora Express" runs again on the Sierra Railroad using old time engine and passenger cars. Train starts at Oakdale. Fare $6.50. Write to Ed Turner, 1739 Berkeley Way, Berkeley 3, California.

SUNDAY, OCTOBER 19 The Big Trip over the Sierra Railroad with a through train from the Bay Area over the Santa Fe Railroad. The plans include use of Sierra's new mallet if it is in service by then. Write Don Hedgpeth, 1201 - 29th Avenue, San Francisco, California.

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SIERRA RAILROAD BUYS MALLET LOCOMOTIVE

The Sierra Railroad has purchased a 2-6-6-2 tender mallet from the Weyerhauser Timber Company of Washington and is expecting delivery shortly. The engine will go into the shops for extensive work and it is not known just when it will go into service. Reports are that some of the smaller power will be retired, possibly the 18 and 24.

S.P. GETS P.U.C. DIRECTIVE What started as an application by the SP to abandon two Sacramento-Oakland schedules ended up with an order by the State Utilities Commission order to replace the trains with Budd cars; modernize the other schedules and submit plans to modernize Oakland Pier or substitute bus service over the Bay Bridge. The SP immediately sought a rehearing which has been denied and the matter may end up in the courts. The orders are quite detailed and placed definate time limits on the changes.

MILLS RECOMENDS MORE BUSSES AS USUAL

M. D. Mills (What a doctor!) has recomended busses for the J, N and B lines together with most of the Hyde-Jone-O'Farrell cable line and outer portion of California Street. Mrs. Klussmann has already risen to the defense of the cable car line, but a bond issue may be necessary to put over the over all plan. The Bond Plan would cover unification of the cable lines in one power house, the conversions mentioned above, 15 new PCC cars, 95 trolley coaches, 113 diesel busses , shop renovations and track removal. Eight millions are expected to do the job.

WESTERN PACIFIC SELLS TWENTY MILLION POUNDS OF STEAM LOCOMOTIVES FOR SCRAP IN ONE BIG DEAL!!

Luria Bros fell heir the first part of June to 20-million pounds of W.P. locomotives for scrap. All of the 251 and 401 class mallets, the remaining 171 mountain type (173, 176 and 179), plus two of the baby mallets went in the deal. This ended the 4-8-2's, 4-6-6-4's and 2-8-8-2's on the Western Pacific. The engines are being scrapped at South San Francisco. Two of the baby mallets (2-6-6-2) will be retired in first class shape at Stockton for future use and some of the 4-8-4's will be retired in place (not fixed up, but not scrapped). Steam is going fast on the W.P.

THE WESTERN RAILROADER
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